

Analysis of visitor nodes as a tool for visitor management by the example of Berchtesgaden National Park

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Abstract — Infrastructural elements in protected areas play an important role for visitors. They provide equipment to visitor activities and their demands. However data on infrastructure is frequently disregarded. Concepts and models to collect and deal with infrastructure data have to be developed. In Berchtesgaden National Park the concept of visitor nodes is used in order to support visitor management. Identification of 81 visitor nodes in this protected area took place. They have been classified into five categories: “place for excursions”, “destination for hiking”, “information”, “resting” and “orientation”. Each category is characterized through a defined standard supply. By using categories, evaluation of each visitor node was done. Deficits as well as satisfying situations became observably.

Index Terms — visitor nodes, recreational use, visitor management, infrastructure and statistical analysis

1 BACKGROUND

Today changing visitor demands as well as rising numbers of visitors pose challenges for visitor management in protected areas. Park management is confronted with the complex task of combining recreational and ecological objectives in a sustainable way. Here infrastructure plays an important role: infrastructure enables public access, facilitates visitor use, performs environmental issues and meets visitor expectations. In addition – based on this meaning infrastructure is useful to support visitor man-

agement (see Benthien 1997, Job 1991, Zollner et al. 2006).

In consequence knowledge on infrastructure, its equipment and its design is necessary. A detailed survey of the infrastructural situation in recreational and protected areas is preferable (Worboys et al. 2005). It is imperative to “measure what you manage” (Sukhdev 2008: 53). Therefore infrastructural data should be available and managed like other data (e.g. on flora, fauna or soil). However, data on infrastructure is frequently incomplete or is not uncommonly absent in these areas. Reasons therefore are the existence of numerous infrastructural elements for recreation and the large size of protected areas. To apply infrastructure to visitor management in a successful way, it is essential to elaborate methods to deal with infrastructure and its data. Therefore different approaches and models exist. One is the concept of visitor nodes. This concept is especially helpful to get an overview of the infrastructural situation, to evaluate it and to deduce measures. The concept of visitor nodes has been used in Berchtesgaden National Park.

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2 CONCEPTS OF VISITOR NODES

2.1 Definition of visitor nodes

Visitor nodes are areas of spectacular beauty, educational signage, areas of general interest or unique settings. They provide an adequate infrastructural supply (benches, picnic tables, signs, information shelters, elements of environmental education etc.). The equipment can vary from primitive to high developed depending on e.g. visitor numbers, visitor activities, management objectives and the location within the zoning of a protected area (Macleod 2006, Lockwood et al. 2006, Tucker 2006, Worboys et al. 2005).

On the one hand visitor nodes respond to visitor demands by their infrastructural supply; on the other hand they affect visitor demands by this supply.

Originally the approach of visitor nodes comes from the Australian recreational planning processes. However, in Central Europe numerous terms for such sites also exist. Examples are hot spots, interesting points, points of interest, points of information, attractive or central sites (Hoisl et al. 2000, Schemel 2003).

2.2 Classification of visitor nodes

To be useful in the recreational planning processes visitor nodes should be classified. Therefore it is helpful to focus on recreational activities that take place at visitor nodes. Activities that have to be considered are for example resting, relaxing, playing, eating and drinking, studying, getting information or orientation (Hoisl et al. 2000).

To provide an adequate infrastructural supply at visitor nodes further functions in relation to these activities are significant. These are accessibility, information brokering, visitor management or facilities and services.

According to functions and activities the five following categories can be established:

- “place of excursions”,
- “destination for hiking”,

- “information”,
- “resting” and
- “orientation”.

The five categories are built up as a hierarchical system. This means that the visitor node category “orientation” is the least important category, while the category “place of excursions” is the most important one (Table1).

TABLE 1

CATEGORIES OF VISITOR NODES AND A SELECTION OF POSSIBLE STANDARD SUPPLY

visitor node category	standard supply
place of excursions	elements of accessibility: parking places, bus station, cable car station, landing stage for boats, etc. (not including elements for biking or hiking)
	facility to stay for the night: alpine hut, guesthouse, etc. facility to drink or eat something: restaurant, mountain pasture, cafe, etc.
destination for hiking	information elements: visitor centre, information board, map, shelters, etc.
information	elements for resting: bench, table, etc. elements for playing: playground, swing, etc. access: to water (spring, brook, lake, etc.)
resting	elements for orientation: signs, markers, etc.
orientation	

The category “orientation” just provides infrastructural elements for orientation like signs and markers. Visitor nodes within the category “place of excursions” should provide infrastructural supply of all five categories: orientation, resting and information elements, aspects of a typical destination and specific accessibility (Hoisl et al. 2000, Schemel 2003).

2.3 Standards of visitor nodes

Each category should offer a specific array

of infrastructural elements. Thereby standard equipment for each category is defined (Table 1). For example, a visitor node of the category "information" should include the following standard supply: information of the National Park, resting infrastructure and orientation elements.

General standards are needed to make evaluation possible. In consequence, the actual equipment at each visitor node can be evaluated with the defined standard supply. Deficits as well as satisfying situations can be observed.

3 STUDY AREA

Berchtesgaden National Park lies within the Alps in the south-eastern part of Germany at the border to Austria. The park area extends about 21000 hectares with an elevation ranging from 600 m (Lake Königssee) to 2700 m (summit of the Watzmann Massif) above main sea level (BayStMLU 2001).

The region of Berchtesgaden is one of the oldest holiday destinations in the Alps. Today more than 1.3 million people visit the Park every year. Main recreational activities are promenading, hiking, mountain climbing and biking. High season is during the summer months. Besides different facilities and services, 236 kilometres of trails, nine alpine huts and six information centres are available for visitors. Landscape attractions are viewing points, alpine meadows, waterfalls, wild life viewings and lakes (BayStMLU 2001).

4 METHODS

In Berchtesgaden National Park the concept of visitor nodes was used to evaluate the infrastructural situation. It exposes deficits as well as satisfying conditions.

Here the following steps have been applied. An inventory of visitor nodes has been done. Based on data collection and management, evaluation of visitor nodes took place using the defined categories.

4.1 Data collection and management

Visitor nodes and their infrastructural equipment were measured on site using a specific survey and GPS mapping. Supplemental data has been added from the GIS of Berchtesgaden National Park, different maps and literature. Table 2 gives an overview of the collected data.

All data is managed in a data model in RDBMS Oracle 10g XE using also Oracle Spatial. The data model also manages photographs and outlines transferred into "html-pages".

TABLE 2

OVERVIEW OF THE COLLECTED DATA IN
BERCHTESGADEN NATIONAL PARK

data	description
natural environment	water bodies (lake, brook, etc.), vegetation, viewing points, punctual attractions of nature, wild life viewings, etc
recreational infrastructure	information elements: signs, maps, boards, etc. resting elements: benches and tables, places for picnics, playing elements, refuges, etc. orientation elements: Signs, markers, etc.
mobility and accessibility	parking places, cable car stations, bus stations, landing stages for boats, etc.
facilities and services	restaurants, cafes, mountain pastures, alpine huts, toilets, etc.

4.2 Data evaluation

By having the description of each visitor node and the standard supply of the five defined categories a systematically evaluation was done. The actual infrastructural situation of the visitor node was compared with the defined standard supply of its belonging category.

A numeral code has been developed. The code structure represents the hierarchical system of visitor nodes. That means that the code for the visitor node category

“orientation” consists of one numeral, for the category “resting” of four, for “information” of five, for “destination for hiking” of six and for the category “place of excursion” of seven numerals. Each numeral refers to a specific type of element. Table 3 displays an example.

The value of the numerals represents the number of elements according to the respective infrastructural type at a specific visitor node. The value can vary from 0 to 3:

- 3: high equipped (high developed),
- 2: semi equipped,
- 1: primitive equipped and
- 0: for no elements existing.

By using this code the management overviews the equipment on each visitor node. Deficits and benefits of visitor nodes become observable. In consequence possible recommendations can be made for sites (to equip the visitor node with adequate infrastructure) or the whole park area (to equip the area with presentable visitor nodes).

TABLE 3

AN EXAMPLE FOR THE NUMERAL CODE

visitor node category	position of the numeral	description (numerals 0,1,2 or 3)
place of excursions	1	elements for orientation
	2	access to water
	3	elements for playing
	4	elements for resting
	5	information elements
	6	facilities to stay for the night or to drink and eat something
	7	specific accessibility

5 RESULTS AND DISCUSSION

In Berchtesgaden National Park 81 visitor nodes were identified. Their distribution by categories is as follows:

- 6 as “place of excursions”,
- 26 as “destination for hiking”,
- 17 as “information” and
- 32 as “resting”.

5.1 Example of area specific evaluation

Some regions in Berchtesgaden National Park have a special importance. They are used intensively for recreation and are characterized by high visitor numbers. Examples are the Wimbach-Valley and the Jenner-Area.

In the Wimbach-Valley ten visitor nodes are located. This valley indicates a satisfying situation. All categories of visitor nodes are represented and the infrastructural situation at these nodes is very well equipped.

By contrast, the Jenner-Area shows some deficits. Here 15 visitor nodes are located. Nine of them are classified into the categories “place of excursions” and “destination for hiking”. Although there is a considerable amount of visitor nodes within these categories, there is no corresponding amount of information elements concerning the protected area (Figure 1). But categories like “place of excursions” and “destination for hiking” should provide such information. This corresponds to the management task environmental education of National Parks.

5.2 Example of site specific evaluation

Site specific evaluation focuses upon the infrastructural situation at individual visitor nodes. As already explained, the numeric code for each visitor node indicates missing infrastructure. To illustrate this, one example on the visitor node category “information” is given.

For the category “information” seventeen visitor nodes have been identified. The code shows that within this category only two sites have an optimum standard supply. This means that all aspects (information elements, elements for resting and orienta-

tion) exist at these visitor nodes. Another two points are classified as high equipped. The remaining 14 visitor nodes range from primitive to semi equipped. Half the visitor nodes classified as semi equipped have no resting elements. They just provide information elements. Furthermore, the orientation elements are absent. Finally just seven visi-

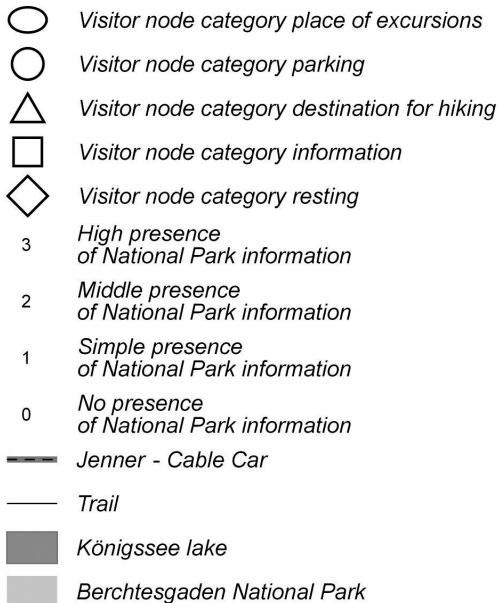
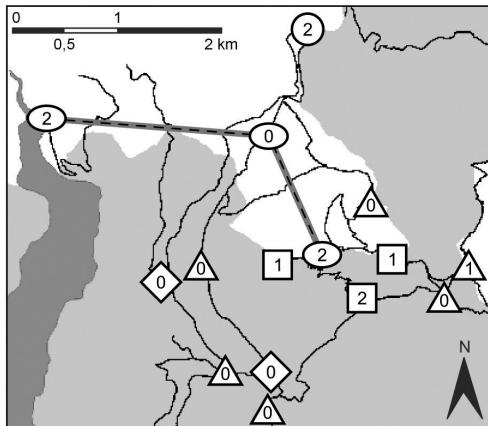
tor nodes within the category “information” provide orientation elements. Need for action is obvious.

6 CONCLUSION AND OUTLOOK

The concept of visitor nodes has proved to be sufficient in Berchtesgaden National Park. It is useful to evaluate the infrastructural situation. Due to the visitor nodes categorisation information on infrastructural elements is well organized. Deficits can be found within short time and measures can be set up.

Further studies should work on the characterization of visitor behaviour at visitor nodes. The information gained can be relevant to improve the equipment.

At the moment the concept of visitor nodes as it is presented in this paper is only applied in Berchtesgaden National Park. The evaluation and application in other protected areas would be an interesting aspect.



Database: GIS National Park Berchtesgaden, GIS Interreg III A Projekt "EuRegionales Erholungsgebiet Nationalpark Berchtesgaden/ Salzburger Kalkhochalpen" (Dr. Sabine Hennig), Data collection Johanna Pfeifer 2006
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Figure 1: The map displays the Jenner-Area in Berchtesgaden National Park.

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